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Application of University of Arizona Study

University of Arizona Study

In May 1999, the University of Arizona and Inyo National Forest entered into a Cost Share Agreement to conduct a study in the John Muir and Ansel Adams Wildernesses to evaluate the spatial distribution of visitor use. Dr. Randy Gimblett from the School of Renewable Natural Resources at the University in collaboration with staff from the Forest designed a data collection tool to collect spatial data in 9 geographic areas in the two wildernesses. The study was conducted during the summer of 1999. In 2000, the study was repeated in the 3 areas with more complex influences.

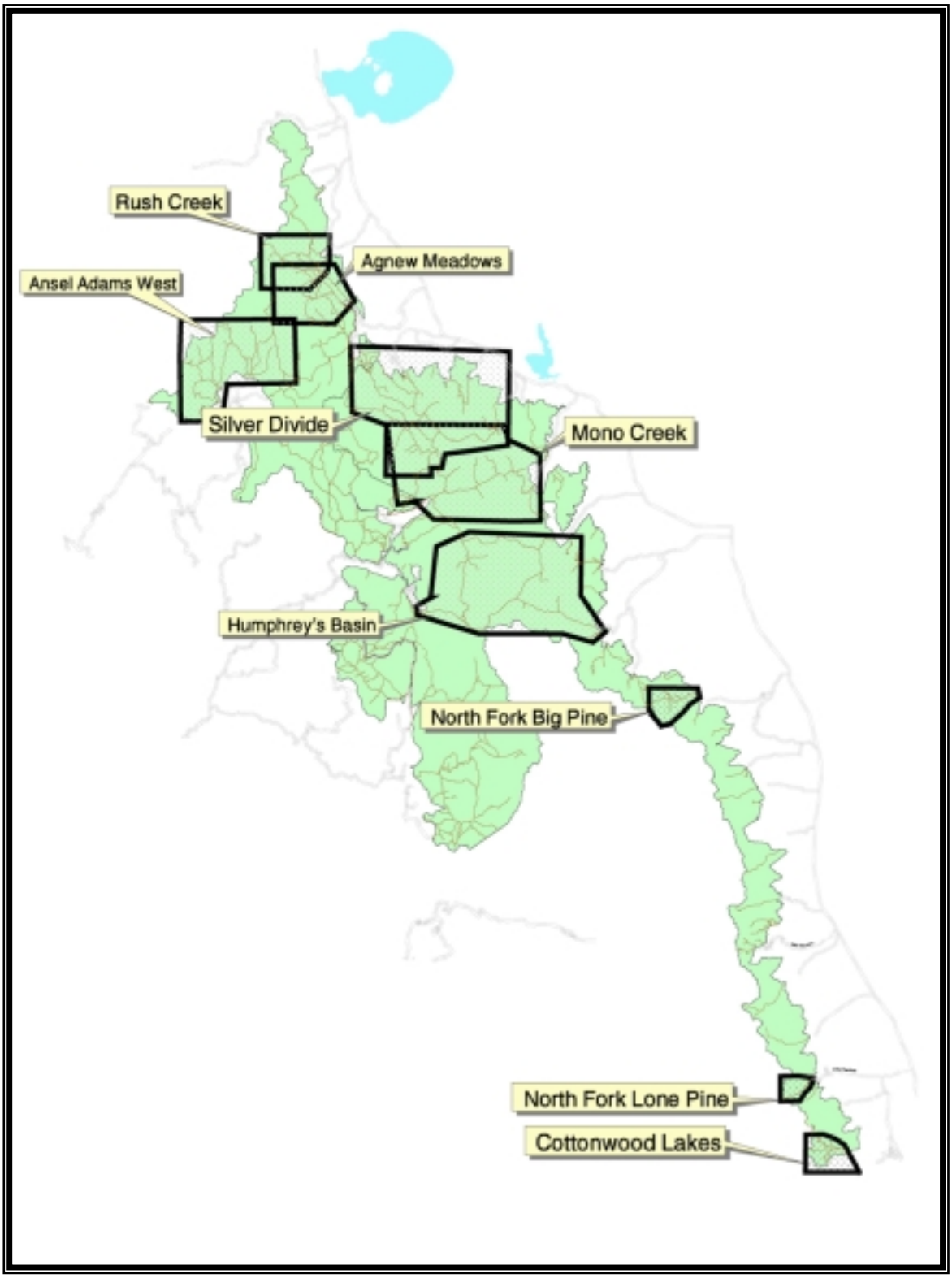
The primary driver of the study was the need to augment current use data for management planning[1]. Adequate data existed on levels of use by entry but only observations and assessments on distribution, congestion points or patterns were confidently known. Of particular interest was the influence of east and west side entries into the large and topographically complex interior.

Secondarily, there was a desire to integrate resource data with use pattern data as a tool for evaluating management techniques. This also seemed a critical piece of information in evaluating risks. Identifying areas of potential congestion in combination with visitor use impact data such as campsite conditions, use trail or trail conditions, or relevant resource information on TEPS (threatened, endangered, petitioned or sensitive) species habitats, populations or potential habitats, could provide decision makers with reasonable information for evaluating consequences.

There were nine study areas identified. These included 3 areas of east/west complexity – Humphrey's Basin, Mono Creek, and Silver Divide; and 6 areas of moderate use levels – Ansel Adams West, Agnew Meadows, Cottonwood Lakes, North Fork Lone Pine, North Fork Big Pine and Rush Creek.

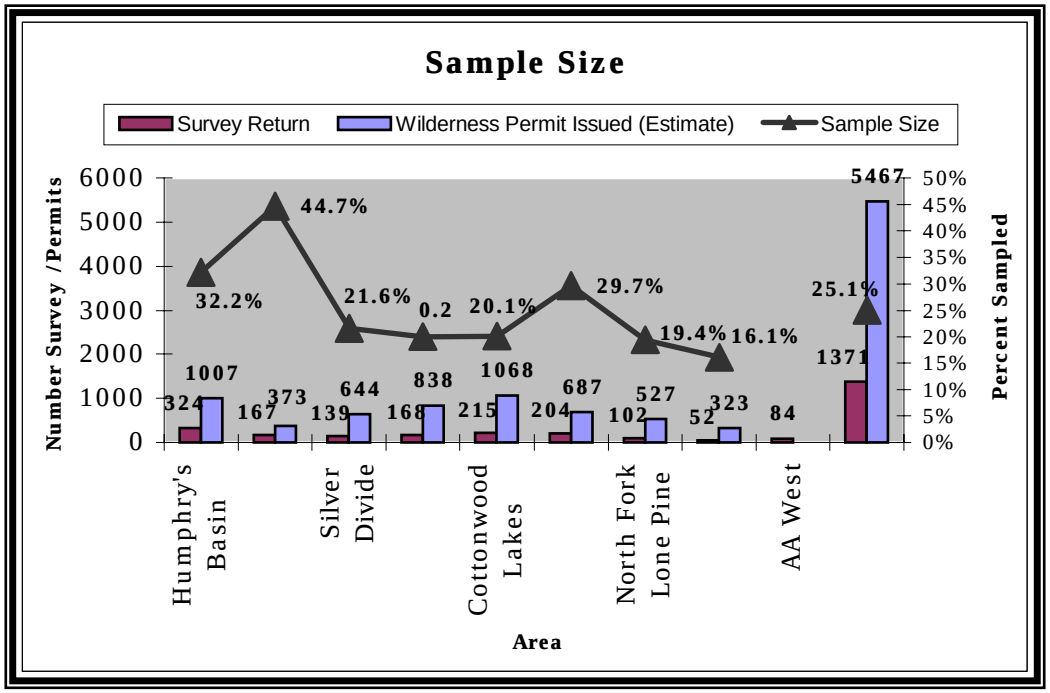
[1] The Revised Environmental Impact Statement for Management Direction for the Ansel Adams, John Muir and Dinkey Lakes Wildernesses.

Figure N-1: University of Arizona Study Areas



A trip report was designed to gather spatial data by visitors while on their trip. Parties recorded their trip and indicated on the map provided where they camped, where they encountered people while traveling and where they encountered other parties while camping. Visitors were also asked to map where the most and least solitude was experienced and which was their best and worst campsite. Trip reports were distributed through the wilderness permit system, by intercept on trails by research assistants, self administered at trailhead displays, and by pack stations and guides. In addition to the mapping of their trip and recording spatial information, questions were asked regarding the level of solitude experienced, crowding expectations, and perceptions of conditions.

Figure N-2: Sample size of the 1999 survey by study area.



The return rate averaged between 16% for parties at Rush creek to 45% at Mono Creek, with an overall average of 25%. For this type of survey (self return and intensive reporting required) 20-30% is considered good (Gimblett, pers. comm).

The mail back sampling methodology in wilderness settings, while providing an abundance of information about visitor experience, tends to have lower return rates. A return rate 20 to 25% is considered high and a representative sample using mail back surveys. The diary format sampling methodology while not as frequently used as the mail back or interview methodology, has also been shown to provide low visitor return rates but is considered an excellent methodology for understanding the spatial distribution of visitation patterns.

This study utilized the diary format to acquire information on visitation patterns of use. In many backcountry settings it has been difficult to get accurate information on where people go. While wilderness permits document where people are planning to go, there has been no way to actually determine whether visitors stick to their original itinerary. One objective was to determine what causes changes in itinerary. Unfortunately most visitors indicated "other" from the list of expected reasons, so this information still eludes managers, and is likely diverse enough to not be of concern from a management perspective.

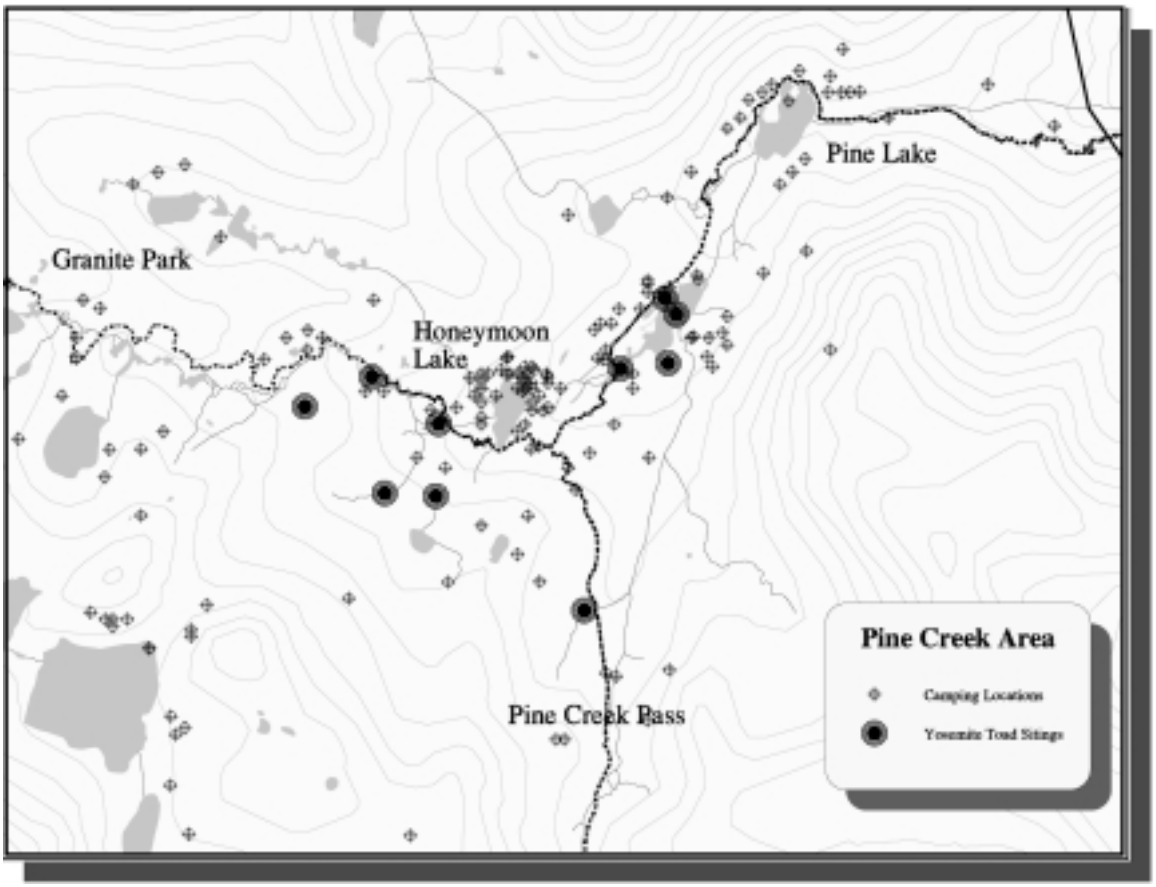
Application

The data has valuable applications for managerial and planning purposes. Utilizing geographic information system technology has provided a mechanism to measure the spatial/temporal patterns of visitation as well as aiding in providing a visualization of how visitors utilize the backcountry. In addition, the relational database, which contains the associated data, can be statistically analyzed to provide summary information on how much use is occurring, as well as visitor assessment of backcountry conditions.

Findings demonstrate that the most intense areas of congestion occur within the first 4-6 miles from the trailhead, where encounters are frequent. Throughout the study areas, use tends to concentrate along primary trail corridors and a small percentage of lakes, passes and junctions. In Humphrey's Basin the greatest dispersal of use occurs, yet concentrations are still evident, even off trail. Overlaying visitors locations of their most and least solitude provides an interesting comparison. Similarly, comparing across the study areas where generally people seldom, often, or never experienced solitude leads to more questions of what conditions might influence these perceptions.

Results of this study vividly demonstrate use patterns in a spatial context. This enabled managers to overlay other spatial coverages, such as occupied habitat of species of concern or other resources of sensitivity, indicating areas of concern.

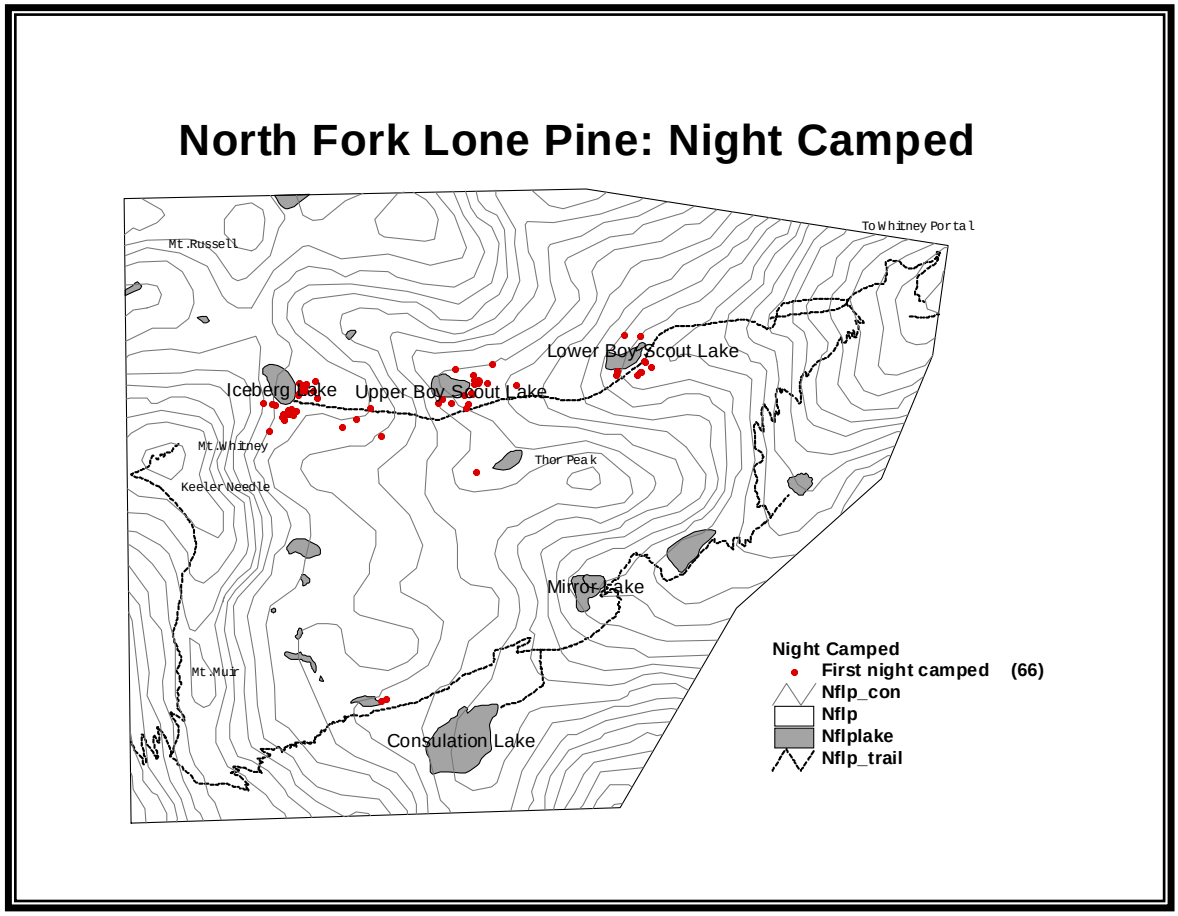
Figure N-3: Example of GIS overlay of documented Yosemite toad sightings (species of concern) with locations of observed campsites (use pattern).



Use patterns were identified and used to analyze current conditions and apply different managerial applications. Overlaying the spatial distribution of use with the proposed recreation category assignment in Alternative 1 in the RDEIS, assisted managers in determining the application of the category as well as the effects of the proposed direction. Managers considered use patterns, as well as resource concerns and conflicts between use and resources, in assigning the appropriate recreation category for an area.

Where people camped was of interest, particularly the dispersal of use from the first night to the second and third. In some areas like Cottonwood Lakes there was a trend towards camping in one spot the entire trip versus the obvious traveling trip in Humphrey's Basin and Silver Divide. Mono Creek results show the intense concentration in Fourth Recess. Of minor notation was the different length of stay by area. Collection of campsite data in these locations provides a comparative look at use intensities and impacts.

Figure N-4: Example of GIS coverage of locations where parties camped on their first night in North Fork Lone Pine Creek.



More specific information can be gleaned from looking at the type of encounters. One example is packstock use, which represents a small percentage of overall use, yet in the Humphrey's Basin, Silver Divide, Rush Creek and upper Mono Creek areas, there is a noticeably high rate of encounters with pack stock.

Another interesting piece of information was how visitors rated their experience of solitude. Visitors spatially documented solitude, a dominant wilderness theme and quality to manage for, by locating their strongest and least sense of solitude on their trip. The power of the spatial survey was evident here as the manager could immediately see the locations of high and low solitude and detect patterns. Visitors were also asked how often they experienced solitude on their trip. This could then be seen comparatively by area, and patterns were detected. Places such as Ansel Adams West had a high percentage of visitors who 'seldom' experienced solitude on their trip, while North Fork Lone Pine Creek, and Rush Creek had the highest percentage of 'often' experiencing solitude.

How often did you experience Solitude

Area	*Never*	*Seldom*	*Often*
AA West	1%	92%	7%
Agnew	2%	67%	31%
Cottonwood	3%	67%	30%
Humphrey's	3%	77%	19%
Mono Creek	2%	65%	30%
North Fork Big Pine	3%	70%	26%
North Fork Lone Pine	7%	57%	36%
Rush Creek	4%	63%	33%
Silver Divide	3%	71%	27%

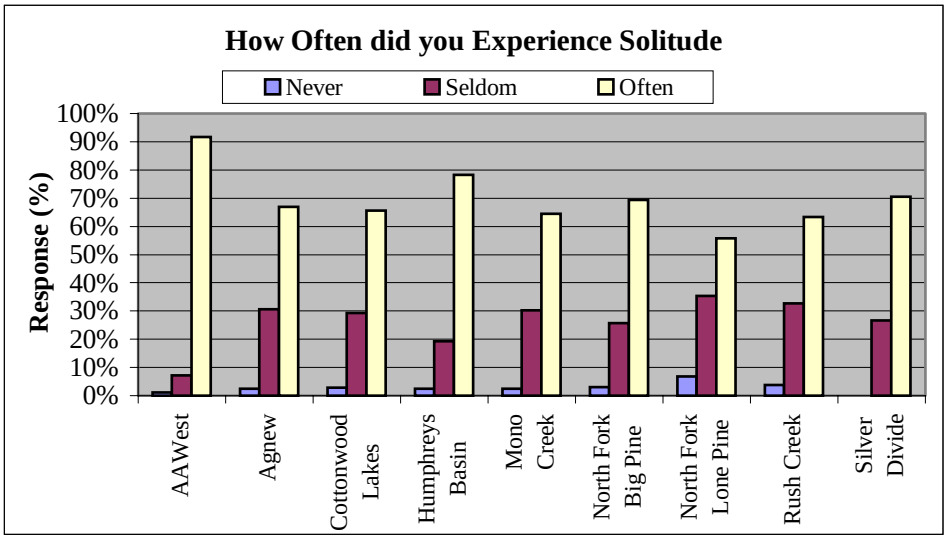


Figure N-5: Chart and tabular results of question "How Often did you experience solitude?"

Similar comparative analysis was done with the trail condition and campsite condition questions. What was more interesting than the results for each area was how each area compared to the other areas. Results indicate that Mono Creek ranked the worst in trail conditions while the North Fork of Big Pine was rated the best. This information could contribute to direct priorities for future trail work and assessing the conditions at a minimum. Campsite areas that ranked high for acceptable conditions were North Fork of Lone Pine and Ansel Adams West.

How often did poor trail conditions affect your experiences

Area	*Never*	*Seldom*	*Often*
AA West	51%	38%	7%
Agnew	53%	35%	11%
Cottonwood	64%	31%	6%
Humphrey's	47%	41%	12%
Mono Creek	47%	35%	18%
North Fork Big Pine	71%	23%	5%
North Fork Lone Pine	61%	25%	15%
Rush Creek	58%	40%	2%
Silver Divide	50%	40%	11%

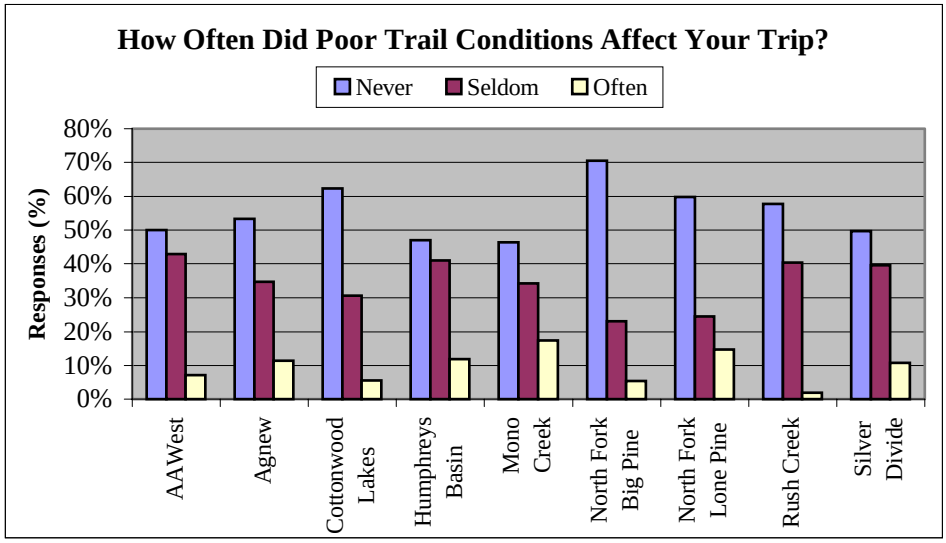


Figure N-6: Chart and tabular results of parties perceptions of trail conditions.

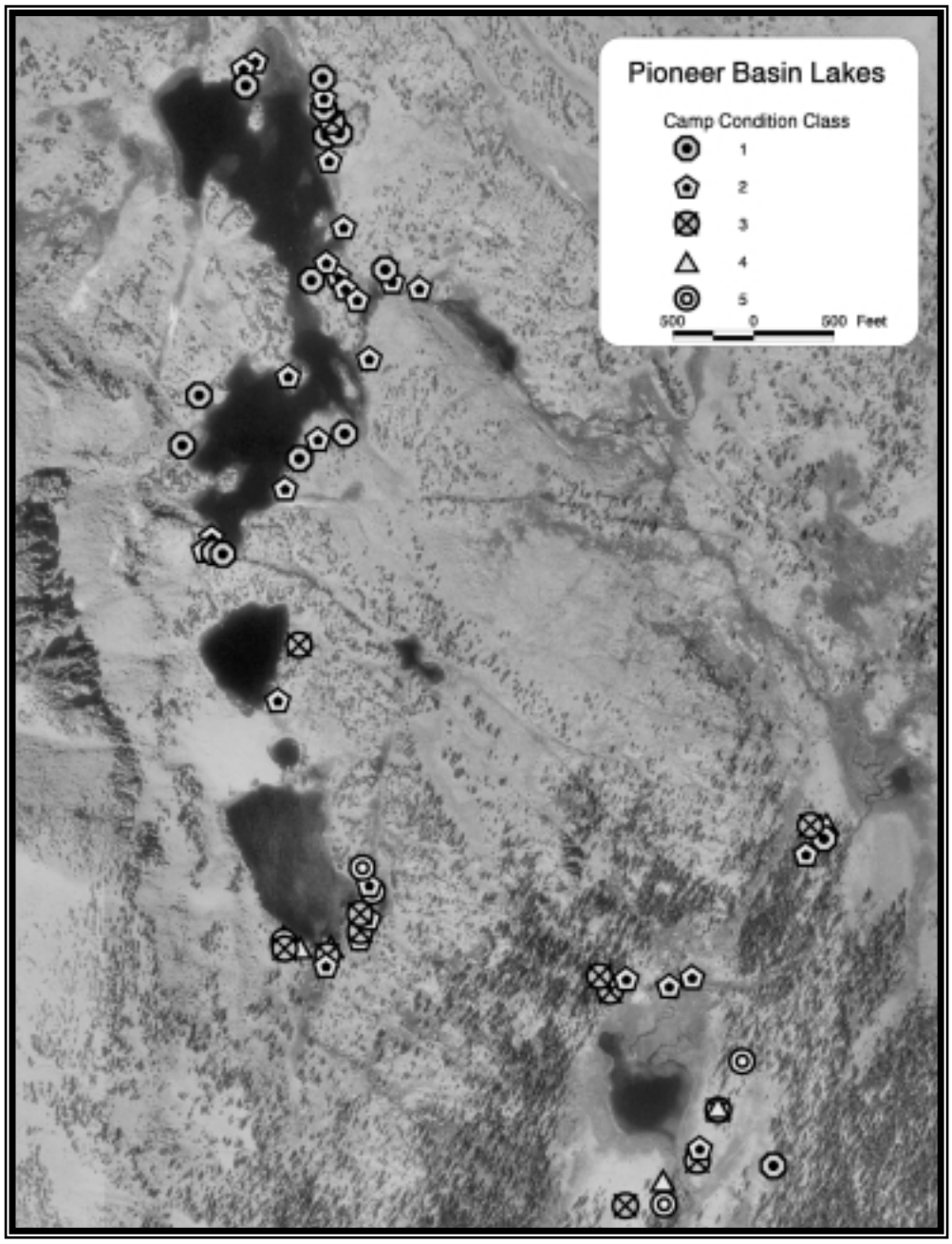
Results could be put together in such a way as to contribute to describing current conditions and rationalizing proposed use levels. For example, Ansel Adams West indicated that visitors don't experience solitude often (area of congestion) but this area is managed in such a way (probably high ranger presence and management activities) that the visitors find the campsite conditions acceptable.

Where visitors indicated they saw other people camped was also useful in evaluating use levels and validating or determining quotas. It aided in further identifying areas of visitor use concentration temporally. Seeing where people camped can indicate spatial concentrations, but encounters with others parties camped (an indicator used in 3 alternatives in the RDEIS) indicates

a quality of temporal concentration or crowding. Whether areas of congestion dominate or if dispersal of use is the dominant characteristic had significant bearing on the derivation of a quota. It was also of interest how many of the more remote locations had occurrences of other parties camped.

To supplement the study, managers on the Inyo and Sierra NF co-ordinated their campsite inventory in the study areas. A GIS coverage of the location and attribute data of each campsite was compiled (Figure N-7). Overlaying this coverage with the self-reported campsite locations can provide amangers some information on the realtionship between the use patterns and the realtive impacts as described by the campsite data. Considerable more work in analysis of these two coverages is being done by students at the University.

Figure N-7: Campsite condition class data (1999) overlaid on ortho-photo of Pioneer Basin.



Future Applications

The information collected in 1999 and 2000 provides some baseline data on use patterns. A report back tool is being considered as a return portion of a wilderness permit. A web-based visitor-map interface could also be used to gather post trip data spatially. Perhaps this can continue to inform managers of user perceptions and trends in crowding conditions.

In addition, managers can assess effectiveness of management actions in implementing new management direction and being adaptive in responding to concerns, risks and threats. Continued analysis of geographic information coverages, (i.e. species habitats and occurrences with camping and travel patterns) and identifying intersecting resource concerns can inform site specific decisions.

Spatial information on travel and camping patterns can prioritize and direct campsite inventory work and user-trail inventory as well as other inventory and monitoring work. Finally, one of the goals of the research project has been to develop user profiles that characterize visitor behavior and choices. This profile information is then used to model use patterns and perform projections of patterns based on modifying management actions, use levels, timing of use or spatial controls. Simulation modeling of recreation use has been applied in conjunction with Dr. Gimbletts research through collaboration with Bob Itami of Digital Land Systems Research in Melbourne, Australia. The application of the Gimblett data to the Itami model of simulating use patterns is in progress. Results could provide a tool for adaptive management in the on-going managing of temporal and spatial use in the wilderness landscape.